**Karlsruhe Institute of Technology**
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# Call for Master Thesis
# **Using Graph Neural Networks to**
# **Predict Future Trends in Science**

## What is the motivation and general goal?

Trend detection approaches for phenomena in science usually focus on bibliometric indicators, such as the amount of citations a paper will receive in the future. However, the story of a research paper begins way earlier and involves questions like what methods and data to use. To be of use in these early stages, trend detection approaches need to consider things like data sets and methods, rather than written papers. The goal of this thesis is to develop GNN based models for link prediction in large graphs of scientific entities (papers, methods, data, etc.).

## What are the details?

To predict novel, promising research endeavours (i.e. potential trends), we use a large corpus of scientific papers and the "artifacts" used within them and train models to predict links between artifacts that have not been observed before. We therefore model our corpus as a dynamic graph, which means papers and their artifacts appear in the graph when they are published. On this graph we then



formulate a link prediction task. Goal of the thesis is to use and improve graph neural network based machine learning models for aforementioned taks.
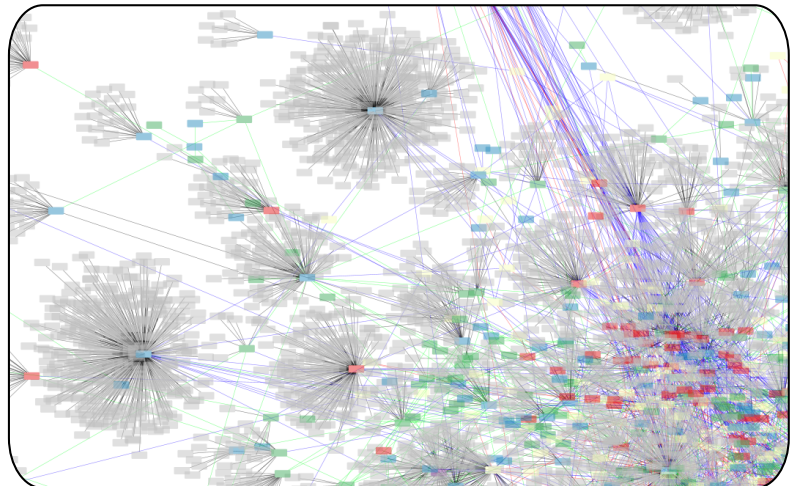
## What are the prerequesites?

- Interest machine learning, and working with large data sets.
- No fear of actually implementing the methods you develop.
- Prior knowledge about or experience with GNNs would be benefitial.